APPENDIX

Notes for F.O.M.C. Meeting
October 4, 1983

Sam Y. Cross

The dollar has put in a mixed performance since your last meeting, having strenghtened in late August and softened in September. This followed a similar pattern in U.S. interest rates and interest rate differentials during the period. Release of trade figures showing a widening deficit, and a record $7.2 billion gap for August, had relatively little immediate effect. By the end of the inter-meeting period, the dollar showed a net drop against the Swiss franc and yen of 1 percent and 4 percent, respectively. Against the German mark it eased only marginally and it actually rose against a number of other EMS currencies. On a trade-weighted average the dollar was virtually unchanged.

For much of the period, market attention was riveted to the release of weekly money supply figures. However, with M1 coming well within its monitoring range, the markets may now be looking more at the relative strength of the economies in the major industrial countries as a guide to future monetary policy actions.

Now that the growth in the U.S. economy is slowing from the heady pace of the second quarter, the contrast with other major countries' recoveries appears to have narrowed. Interest rates in the United States had eased back from late August levels,

and the exchange markets in the latter part of the period came to expect to see a further decline in interest rates over the next weeks. Consequently, the dollar looked increasingly vulnerable on the downside.

Nonetheless, earlier experiences, when the dollar bounced back despite expectations of decline, discouraged market participants from taking sizable positions against the dollar. Also, trading was subdued prior to the quarter-end. As a result, dollar selling was moderate. To the extent that market participants sought to buy alternative currencies, they tended to focus on those thought to have the greatest upside potential--the Swiss franc and the Japanese yen. The German mark was weakened by the perception that the Bundesbank would still, in light of the sluggish recovery and weak export growth, like to accommodate further growth and would accept continued high expansion of money stock. The Bundesbank did raise its Lombard rate by 1/2 percentage point early in September, but the market interpreted the move as a delayed and less than fully convincing reaction to an overshooting of Germany's monetary aggregates. Thus, the German mark, while advancing relative to other European currencies, nevertheless lagged in its advance against the dollar. Nevertheless, this experience suggests that an even modest gain of the DM against the dollar has the potential of exerting strains on EMS relationships.

In sum, the balance of sentiment seems to have turned slightly and tentatively against the dollar. But at the same time, the dollar's resilience over the past several months has still been impressive and few dealers are willing to go out on a limb and declare that the dollar has turned around.

PETER D. STERNLIGHT

NOTES FOR FOMC MEETING

OCTOBER 4, 1983

Monetary growth was quite moderate in August and September, running a little below the Committee's projected June - September growth rates for all three measures, and producing the happy circumstances in September that M1, 2 and 3 were all within their annual growth ranges. This was the first time since 1980 that all three beasts had been caged at one time. Against this background, along with a sense of somewhat moderated momentum in the pace of economic growth, weekly nonborrowed reserve targets incorporated a gradually declining level of adjustment and seasonal borrowing, starting with the $800 million midpoint of the $700-900 million range agreed to at the last meeting and working down to $700 million and then $650 million after a Committee conference call in early September.

Open market operations were complicated by a huge run-up in Treasury balances at the Federal Reserve, far in excess of expectations in the latter half of September, while market factor misses added to difficulties also in late August. Reflecting these complications, weekly borrowing bulged to about $1.2 billion and $1.6 billion in the weeks of August 31 and September 21, but in the other three full weeks it was close to plan at around $650-750 million. Borrowing is also running fairly high in the current week, averaging nearly $1 billion through Sunday, due to high borrowing on the quarterly statement date. The predominant level of Federal

funds trading receded from around 9 5/8 percent in mid-August to about 9 1/2 percent in late August through most of September. Somewhat oddly, the funds rate dropped in the September 28 week to an average barely over 9 percent, with sizable trading between 8 and 9 percent, in the very midst of the period of high Treasury balances. This seemed to result in part from the distribution effects of the high Treasury balances at commercial banks, which tended to favor large money center banks and relieved their needs to buy funds. Also, our own efforts to be sure to replace the reserves being drained by soaring Treasury balances at the Fed tended to augment reserve levels early in the statement week, and some market participants saw the Desk's large scale efforts as being designed to produce a net easing. A different story emerged at the very end of September when quarter-end window dressing added to reserve needs already bloated because of high Treasury balances, and funds trading climbed well above 9 1/2 percent despite large Desk injections of reserves. Yesterday, it looked like we were starting to get back to normal with funds opening at 9 3/8, but the rate climbed above 9 1/2 later in the day.

Early in the period, outright holdings of bills were reduced by about $1 billion through a run-off of maturing issues and sales to foreign accounts. These declines were more than offset later through purchases of $2.1 billion of bills in the market and about $1.1 billion from foreign accounts. The net rise in outright holdings was thus about $2.2 billion. Extensive

use was made of System repurchase agreements, especially in the last couple of weeks of very high Treasury balances. On one day, we arranged a record $14 billion of such agreements. On two occasions the Desk executed overnight matched sale purchase transactions, which served the dual purposes of withdrawing projected reserve redundancies and cooling market speculation that exaggerated the extent of System willingness to be accommodative.

The super-high Treasury balances reached a peak on September 30--$16.6 billion at the Fed and $37 billion in total--and are now heading down as Social Security payments take out a big bite these first few days of October. While the balance at the Fed is likely to stay above the normal $3 billion level well into October, this should not be on a scale that will present any great problem of reserve management.

The past intermeeting period was not only complicated for the Desk's reserve management; it was also a tougher than usual time for the legion of Fed watchers and market participants in the private sector. Interest rates backed and filled over the period, winding up moderately lower for short-term rates--roughly on the order of 20 to 50 basis points--but only about 5 to 20 basis points lower for most intermediate- and longer-term Treasury and corporate issues. Some "fundamental" factors such as slower money growth and smaller economic gains tended to favor rate reductions, but there was also market concern about prospects for continued Treasury deficits, a resumption of stronger money

growth, and a pick-up in inflation. Technical factors stemming from the high Treasury balances and Desk efforts to deal with them created a smokescreen that obscured efforts to analyze what the Fed was "really up to". Toward the close of the period the predominant conclusion among analysts was that the System was seeking to be more accommodative, but the degree of change was quite uncertain. The two main schools of thought were that after things settled down the Federal funds rate would be around 9 1/4-9 3/8 percent or 9 to 9 1/4 percent. A few outliers on either side believed either that there had been no change from the 9 1/2 percent climate of mid-summer or that a move to 9 percent or below was underway. Even with most analysts ready to conclude that a slight to modest accommodation was occurring, many investors still remained skeptical, looking for firmer evidence of System intentions.

In this atmosphere, as noted, there was only a slight decline in yields of intermediate- and longer-term issues. Still, the Treasury was able to raise a substantial $25 billion of cash in the coupon market--testimony in part to the presence of some investor interest and in part also to the willingness of dealers to hold on to large inventories and wait for further investor appetite to develop.

The decline in bill rates can be traced partly to lower funds rates and financing costs, but also to some diminution of supplies as the Treasury raised very little in

that market while the System and foreign official accounts ate up some market supplies. Yesterday, 3- and 6-month bills were auctioned at 8.72 and 8.92 percent, down from 9.18 and 9.29 percent just before the last meeting. Other short-term rates posted roughly similar declines, leaving CDs, for example, in a 9 to 9 3/8 percent range that could begin to raise possibilities of a near term prime rate decline.

JLKichline
10/4/83

FOMC Briefing

The rate of economic expansion moderated last quarter, notably as a result of a slackening in growth of personal consumption expenditures from the exceptionally rapid pace during the spring. The staff now estimates real GNP growth to have been at a 7 percent annual rate in the third quarter, the same as in the Commerce Department's "flash" report, although there are differences in the composition of output between the two estimates. The overall forecast prepared for this meeting of the Committee, however, is virtually unchanged from that presented to the Committee in August; we are still projecting growth of real GNP to move into a range of 4 to 5 percent in the fourth quarter and remain there during 1984. Recent and projected price developments also are unchanged from the last meeting, and the staff continues to forecast price increases of 4 to 5 percent through next year.

A slowing in consumer spending growth was not unexpected in view of the unsustainable surge in the spring, although the information currently available indicates even less growth than we had been projecting earlier. Auto sales declined appreciably in August from the month earlier, associated in part with the elimination of many sales incentive programs as well as the limited availability of popular models. In the first 20 days of September, car sales tended higher as 1984 models became available. Retail sales other than autos leveled out in July and August, although anecdotal evidence gives a sense of somewhat stronger sales than those now reported. In any event, consumer financial positions and attitudes seem to be in good shape, and the boost given to disposable income by the mid-year tax cut as well as the slowing of consumer spending has restored the saving rate to the 5 percent area, up a percentage point

from the extraordinarily low rate in the spring. The staff forecast entails some pickup in spending this quarter, consistent with continued growth of income.

In the housing market, starts rose in August to more than 1.9 million units annual rate--the highest rate in nearly 5 years. Many tales can be created to explain that number, but frankly it was a surprise and we don't have any definitive explanations. What we do know, however, is that new and existing homes sales dropped in August, building permits were down, and we think this and other evidence points to some decline of starts over the near term. In the staff forecast we have starts declining this quarter, but to a level that is higher than in the last projection.

Business fixed investment continues to expand on average at about the pace typical during the first year of recovery. Much of that spending is concentrated on equipment purchases, especially of office and store machinery. With some categories of structure spending also beginning to firm up, the staff forecast continues to point to further expansion of business investment throughout the next year, induced by growth of sales, rising capacity utilization and strong profit performance.

Businesses also are expected to add to inventories, a force quite important last quarter. Production outpaced sales considerably in July and we believe in August as well. Next year, however, the kick from restocking is expected to wane and the projection calls for inventories to rise about in line with sales.

The wage and price sectors of the forecast are essentially unchanged from those prepared in August. Wage increases continue moderate, and concession bargaining is still occurring in numerous industries.

In 1984 we still project compensation increases of around 5 percent, the same as expected this year, with downward pressures being exerted by unemployment rates significantly above 8 percent and by the lagged impact of improved inflation performance.

Finally, an important uncertainty on the price side in recent months has been the drought's impact on harvests and food prices. For the August meeting of the Committee we raised expected food price inflation considerably beginning in the fourth quarter and throughout 1984; food prices were projected to rise 7 to 8 percent during 1984. While a good deal of uncertainty still remains, we have held to that forecast and the incoming information doesn't point to likely further deterioration in the supply situation. In fact, prices of livestock and grains in spot and futures markets over the past few weeks have leveled out or declined a little following steep increases earlier.

Velocity Presentation
for October FOMC Meeting

Stephen H. Axilrod
October 4, 1983

Velocity is of course the link between money and GNP in the equation of exchange (MV = PY), but whether its behavioral properties are sufficiently stable or predictable to provide a strong basis for monetary targeting as a means of attaining ultimate economic objectives over time has, as we all know, been a continuing subject of intensive economic debate. At one extreme, velocity might be considered as no more than the arithmetic by-product of forces acting independently on the supply of money and other forces acting independently on GNP--hence, an economically meaningless number and making the whole equation of exchange useless as a policy framework. At the other extreme velocity might be found to have a trend all of its own--hence providing a reasonably predictable link between money and GNP, and giving policy content to the equation of exchange.

From another viewpoint, velocity can be considered as the inverse of the demand for money relative to GNP. If we can know what influences the demand for money--and among the factors explaining money demand are income, transactions needs, interest rates, wealth, and institutional change--then we can predict the money needed for, say, a given GNP. But the more one has to go beyond income or transactions needs in explaining money demand, the weaker is the argument for pure or rigid monetary targeting. By rigid monetary targeting, I mean staying on a money course irrespective of emerging developments in financial markets and the economy.

Monetary targeting as practiced by the System, or any other central bank, has never been "pure" in this extreme sense of the term.

But after October 1979, the Federal Reserve did give monetary aggregates, particularly M1, more of a role in the implementation of policy than had been the case earlier. Since last fall, though, the weight of M1 in policy implementation has been reduced, largely because its velocity has behaved atypically relative to earlier postwar experience. And the FOMC has stated in its policy directive that the future weight of M1 in policy will depend on "evidence that velocity characteristics are resuming more predictable patterns."

Some perspective on the problems posed for policy by the behavior of velocity can be gained first by a brief review of M1 velocity. Chart 1 shows the income velocity of that aggregate over the postwar years, with periods of cyclical contraction shaded; the 3-month Treasury bill rate is also plotted (see the bottom line). The two most recent periods in which M1 velocity appears to have been a particular problem, in the sense of behaving unusually, are circled, and I would like to make a few comments about each.

"A" marks the period when NOW accounts were introduced on a nationwide basis. There was a sharp upward adjustment in the velocity of old M1A--the top line on the chart--as would be expected in consequence of the public's shifting funds out of demand deposits into newly introduced nationwide NOW accounts. The extent of such departures from "normal" is largely unpredictable, and was the reason for de-emphasizing that aggregate in policy implementation. At the same time the velocity of M1, including NOW accounts, rather surprisingly did not display particularly unusual behavior--continuing to rise about as usual--even though a slower rise in velocity than normal might have been expected, and was indeed implicit in monetary targets at the time, because of shifts into the new NOW accounts

from assets outside M1. But that slower rise in velocity did not develop probably because historically high and rising interest rates in the period led to other shifts out of M1 that happened to offset the shifts into that aggregate occasioned by the introduction of NOW accounts.

Area "B" relates to current conditions, showing the unusual drop in M1 velocity during the recent cyclical contraction and its slower than usual recovery during the early stages of the expansion. This is seen more clearly in chart 2, which compares recent cyclical experience with earlier postwar cycles. The unusually sharp cyclical drop in M1 velocity and slower rebound, shown by the dashed line in the top panel of the chart, probably reflects a number of factors--early in the period economic uncertainties may have heightened precautionary demands for cash, while later in the period the sharp decline in interest rates in the latter part of 1982 seems to have contributed, with a lag, to a large increase in money demand. It should be noted (looking at the bottom panel) that M1A velocity by contrast has behaved in line with previous cyclical experience--which suggests that the sharp departure in M1 behavior from earlier experience may have something to do with the presence of NOW accounts.

In this context, a major issue, and one raised particularly in the FRB of San Francisco staff paper circulated by President Balles, relates to whether the recent velocity behavior of M1 was predictable from historical experience, given the drop of interest rates that occurred. If it was, it might be said that the introduction of NOW accounts--which have both savings and transactions elements--has not altered the behavioral characteristics of M1.

This is not the place to go into the details of technical economic disputes--which have enlivened, to use a mild word, the field of monetary economics for many decades and show no sign of abating. Let me just say on the technical side that there is little doubt in my mind that the drop of interest rates after the summer of 1982 did contribute importantly to the recent weakness in velocity of M1. However, let me also say that some technical work by the Board staff at least casts doubt on whether the effect has been as great as implied in the San Francisco document. We doubt whether the long-run interest elasticity of the demand for money is as large as they have found, and we also suspect that the introduction of NOW accounts has changed relationships among money, income, and interest rates, contrary to their findings. However that may be, it does appear as if the period of extreme weakness in M1 velocity is drawing to a close, with M1 velocity showing signs of growth, though still at a slower pace than in previous expansions.

The uncertainties connected with M1 velocity have naturally led to more attention on the broader money and credit aggregates. Unfortunately, the velocity of these aggregates is no more stable than for M1 and on balance less so. The bars in chart 3 depict the degree of variability, as measured by standard deviations, in velocity growth for the three monetary aggregates and for domestic nonfinancial debt over the 1952 to 1983 period. These measures are based on moving 4-quarter averages to get away from the noise in quarterly money and velocity figures--the variance of short-run quarter-to-quarter changes in velocity being 75 to 100 percent greater than for the measures shown here.

The upper panel shows velocity measured contemporaneously--that is, money or credit relative to GNP in the same period. On this basis

the velocities of M2 and M3 are more volatile than for M1, although the velocity of total domestic nonfinancial debt is a shade less so. Because such contemporaneous measures of velocity do not allow for the lags between money and the economy--and as a result may be distorted by swings in velocity growth that are in the nature of the case inversely related to contemporaneous swings in money growth--the lower panel depicts an alternative measure of velocity based on contemporaneous GNP and money or credit lagged two quarters. However, this lagged measure of velocity, often stressed by some who perceive money as the driving force in the economy, is almost as volatile as the contemporaneous measure. All of the money supply velocities are slightly less volatile on a lagged basis, difficult as this may be to see on the chart, with M1 still the least volatile by a small margin. On the other hand, the volatility of the domestic nonfinancial debt measure increases markedly from what it is contemporaneously, and it is the most volatile on a lagged basis.

The variability in contemporaneous velocity of the broader monetary aggregates is shown from a cyclical perspective in chart 4. Their velocities in the recent cycle have not behaved unusually relative to past experience--apart from the impact of MMDAs particularly on M2 in the first quarter of this year. However, the range of past cyclical variation for the broad aggregates has been quite wide, as depicted by the shaded areas, and wider than for M1 velocity. Thus, merely from observing past behavior one would tend to be less certain about the likely outcomes for velocities of the broad aggregates than would be the case for narrow money.

It is probable that the broad aggregates are more affected than M1 by shifting attitudes which influence the way the public manages

its savings and wealth. This adds elements not present so much for M1 that affect the volatility in velocities of M2 and M3, effects that appear to persist even when the distorting effects of ceiling rates diminish. As may be seen from the time series plotted in Chart 5, their velocities have not become more stable in recent years even though these aggregates, particularly M2, have been less subject than earlier to distortions from the impact on asset preferences of variations in market interest rates relative to binding deposit ceiling rates.

As with other velocities, credit velocity--plotted as the bottom line of chart 6--also shows substantial cyclical variation, but with some tendency for the variation to be more regular than in the case of the monetary aggregates--as might be expected from an aggregate that probably is strongly dependent on income. However, during the recent contraction, credit velocity did drop more steeply--as may be seen toward the end of the chart--than it had in all other contractions since the 1950's. That might have occurred because of the unusually large role of the federal deficit in sustaining the economy during the contraction--note that the velocity of private debt (shown in the top line) declined about as usual in the recent period. Debt velocity since the recovery began seems to be beginning to reverse its cyclical decline, as it has in the past, but how far the reversal will go seems conjectural to me. A continued unusually high federal deficit relative to GNP may tend to keep the level of credit velocity lower than usual--that is, the recent cyclical decline may not be fully reversed. This could happen since the Federal Government basically must borrow an amount that matches its deficit, while if private sectors were instead contributing the same amount to expansion they would at

least have a greater opportunity to make needed financial adjustments on either the asset or liability side.

While, as has been earlier noted, the velocity of total credit does show less variability than M1 velocity contemporaneously, I would not interpret the greater stability of contemporaneous credit velocity as suggesting that credit is a better intermediate target for monetary policy than, say, M1. Credit flows probably have less connection to income in a causative sense than does M1, at least based on the world as we have known it. For example, we have not found in statistical tests that total credit leads income, whereas we have found such a lead relationship for monetary aggregates, particularly M1. The deterioration in the stability of credit velocity on a lagged basis relative to its contemporaneous velocity that was noted earlier is probably an aspect of this.

M1, also, has its deficiencies as a predictor of future income. Chart 7 shows the difference between predicted and actual values of growth in GNP based on the St. Louis-type model that we have at hand relating GNP growth to current and lagged money growth and a fiscal variable in this case the change in high employment expenditures. A positive value indicates the extent to which actual GNP growth exceeded the model's prediction and a negative value shows the extent to which actual GNP growth came in below the model's prediction. As you can see from the top panel (with the model fit through 1979) M1 did not predict too badly on average in 1980 and 1981 though there were very substantial quarter-to-quarter misses. However, in 1982 and 1983 (with the model fit through 1981) the misses were both substantial and in the same direction, as shown in the middle panel. The model consistently indicated much more nominal GNP, given actual M1 and Federal spending, than occurred. This

of course reflects the sharp and unexpected (by the model) downward shift in velocity. The model's performance did not improve much in 1983, indicating that from this perspective velocity is still well off expected patterns. However, if the model is run with M1A as the policy variable, instead of M1--shown in the bottom panel--its track record is appreciably better for last year and this year--another indication perhaps that the velocity of M1 was thrown off by the presence of newly-introduced NOW accounts (which of course represent the difference between M1 and M1A).

I should note that we also ran the same tests for M2 and M3. They did about as badly as M1 in 1982, but improved much more markedly in 1983 on the average, though there were still sizable errors in individual quarters.

Conclusions about the usefulness of the aggregates that may be drawn from this review of velocities do not suggest any very dramatic adjustment in the process of policy implementation.

First, it does seem to me that the cyclical behavior of M1 velocity in 1982 and much of 1983 was unusual enough to have warranted downplaying the role of that aggregate in policy relative to earlier experience--unless one takes the view that this unusual behavior could have been foreseen within reasonable bounds in advance (which would have meant foreseeing a substantial recession among other things) and that the announcement of a greatly increased M1 objective would not have been misinterpreted by the market and counterproductive for policy.

Second, I would not read the evidence about velocity as suggesting that the broader aggregates have become more reliable as M1 has become less so. But they do not seem to have deteriorated as much as M1 in this particular period.

Third, evidence that M1 velocity is beginning to behave a little more in line with historical experience suggests that the weight of this aggregate in policy implementation might now be enhanced, if it has not already been so. But the evidence is not strong, at least in my view, particularly when the behavior of lagged as well as contemporaneous velocity is taken into account. The circled areas in Chart 8 show in the upper panel that the contemporaneous velocity of M1--the solid line--has stopped declining and is beginning to rise, though the rise remains quite modest; however, the lagged velocity shown as the solid line in the middle panel, still seems to be atypically declining (and would continue to be in the fourth quarter, not plotted, if the staff GNP forecast or even a somewhat higher one is realized).

In evaluating very recent M1 velocity, it may also be useful to look at the turnover rate of its M1A component, the dashed lines in the top two panels. On both a contemporaneous and lagged basis, the velocity of that component appears to have been conforming more to historical patterns following the upward structural adjustment in velocity that dominated its behavior in 1981 and may have had a lingering effect in 1982. This behavior in M1A velocity may add a bit of plausiblity to the thought that the small increases we are beginning to see in M1 velocity could represent something close to the underlying cyclical behavior for that broader aggregate, whose NOW account component may not be actively used to meet changing transactions needs over the course of the business cycle.

But this is conjectural. Moreover, there are reasons--at least two important ones--that argue for limiting the weight given to M1 in policy at this time. First, if the interest elasticity of demand for M1 is much higher than we had believed in 1979--say on the order of that in

the San Francisco document--a fixed money target would become less valuable as a guide for stabilizing income in the face of unanticipated shifts in the demand for goods and services. Instead, the money target itself would have to be modified, perhaps substantially, in response to the sizable impact on money demand, or velocity, of the changes in interest rates that might be needed to stabilize income. Looked at another way, with a relatively interest elastic money demand, policy would have the option in, say, a weakening economy of accommodating to a decline in velocity initiated by a reduction in spending propensities either by seeing GNP weaken or by strengthening money, or both. While I doubt that the interest elasticity of M1 demand over time is or will be as high as it may recently appear to have been from some perspectives, over the near term--so long as NOW accounts with fixed ceiling rates are an important component of M1--the interest elasticity may in practice be fairly high and hence its velocity may be reasonably sensitive to market interest rate variations.

A second reason for caution in increasing the weight of M1 in policy implementation is that we are probably dealing with a new M1 aggregate, not simply an extension of the old one prior to NOW accounts, or at least we can't yet be sure that we are not. And if we are dealing with a new one, we don't have enough experience yet to form a clear notion about its underlying velocity patterns--which in any event will probably be subject to shocks from further institutional change should super NOW accounts become more important, should interest be paid on demand deposits, should interest be paid on bank reserves, or should the deregulation of NOW account ceiling rates proceed more rapidly than expected.

Thus, while there is probable cause to enhance the weight of M1 in policy implementation a bit--perhaps buttressed by supplementary evaluation of its M-1A component--I would not suggest that the time is right to give M1 the same weight or role in policy implementation as in the three years following October 1979. But I would not want to be misunderstood as suggesting that over time the behavior of money in its various manifestations can be downplayed. Money may be more difficult to interpret now because of the institutional changes that we have seen, and are living through, but that does not alter the fundamental that too much money growth over time will lead to inflation and too little to recession in the short-run--it just makes it more difficult to gauge what is too much and too little.

M1 Velocity and Short-term Interest Rates

Quarterly

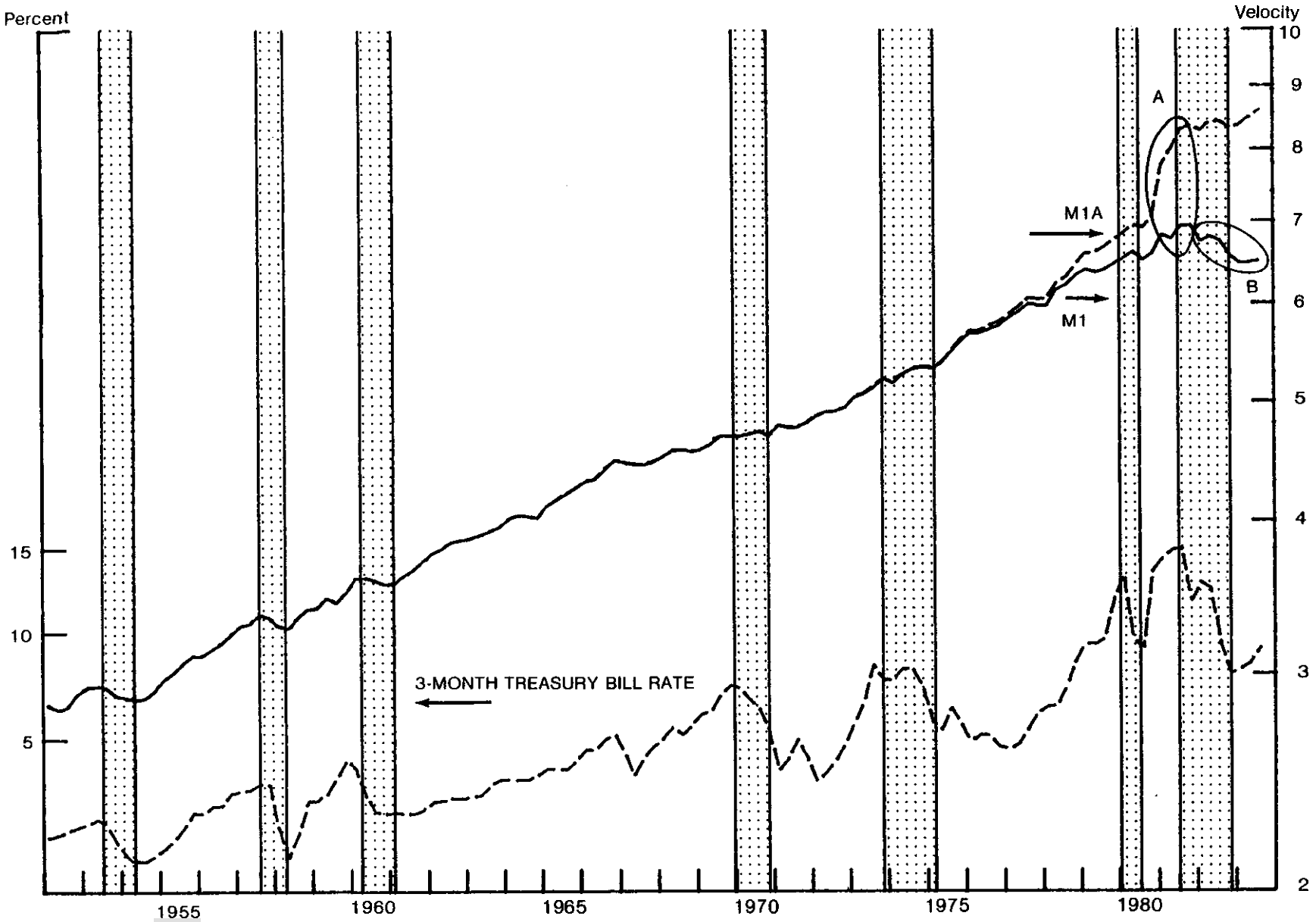
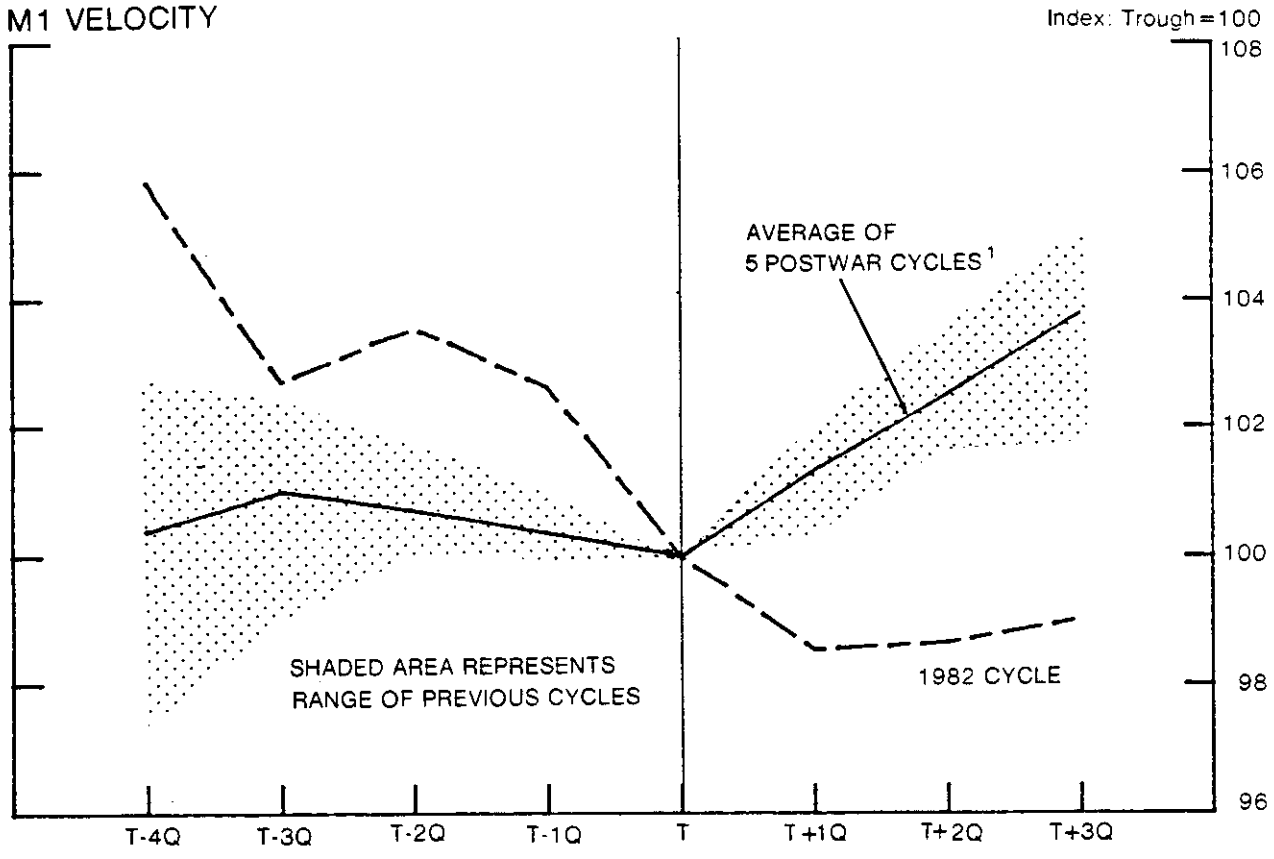
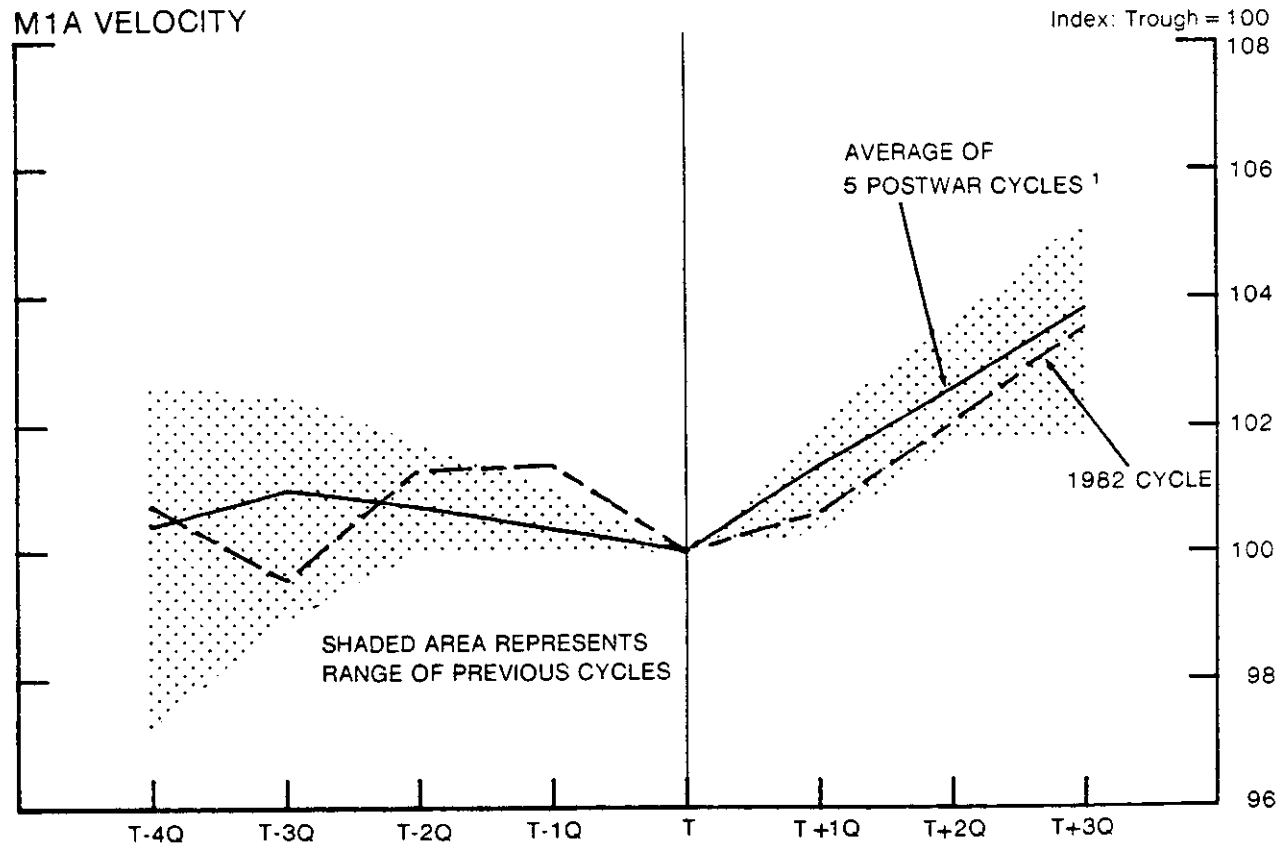


Chart 2

Cyclical Comparison of M1 Velocity



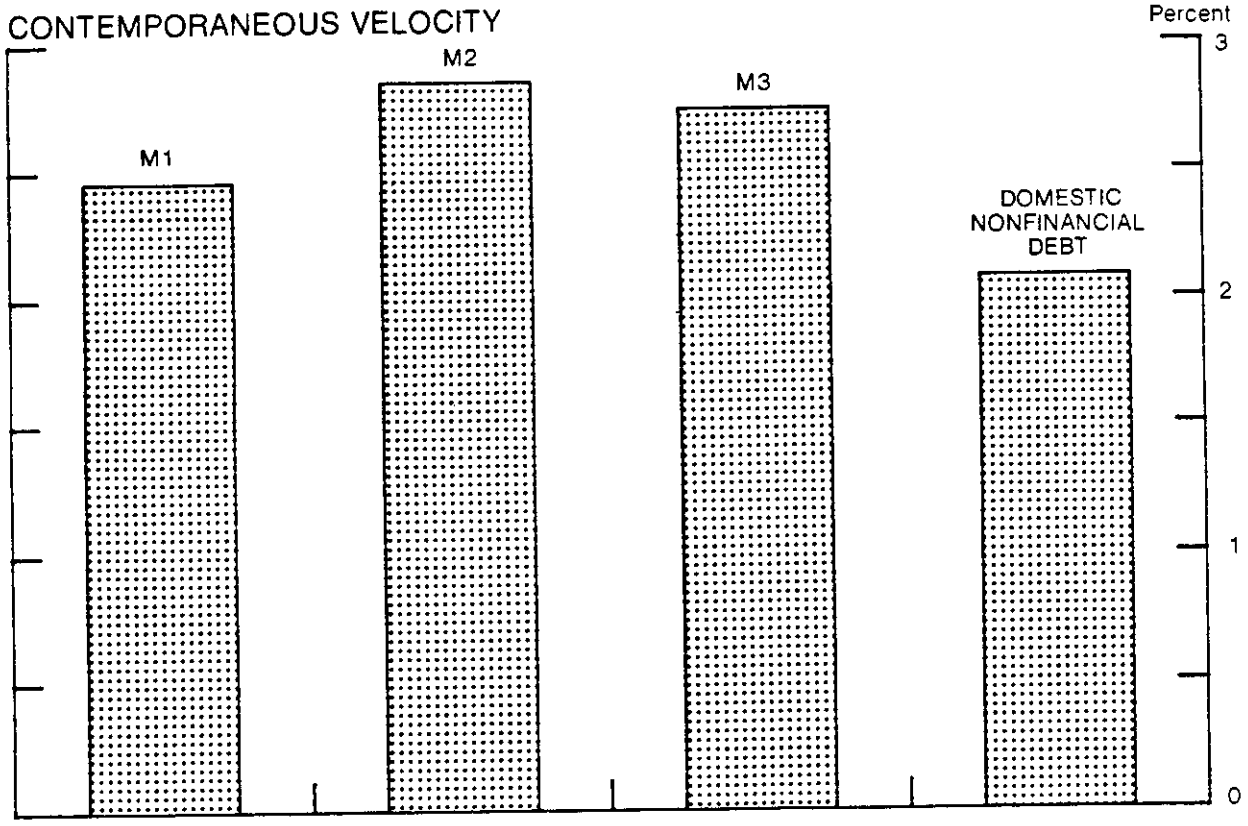


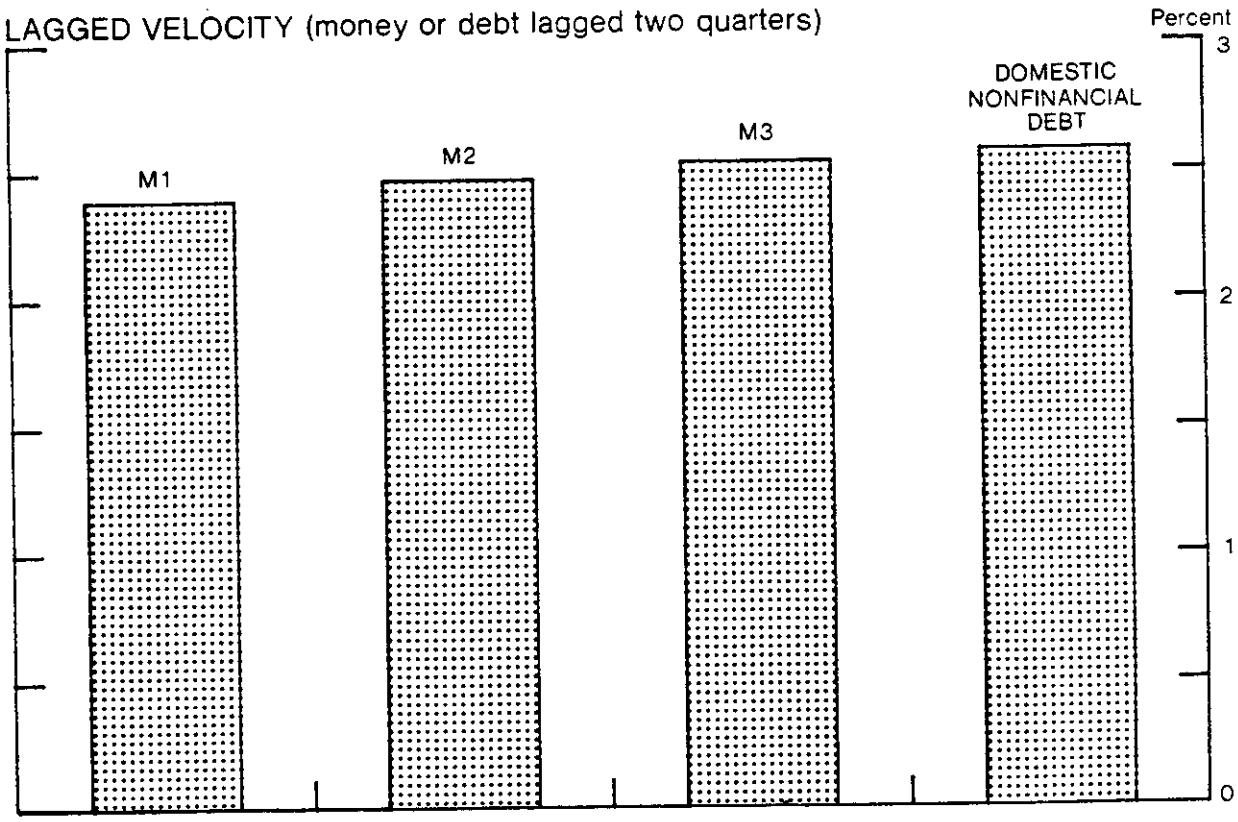
1. Excludes 1948-49 and 1980 cycles.

Chart 3

Variability of Velocity Measures

(Standard Deviation of Four Quarter Growth Rates)

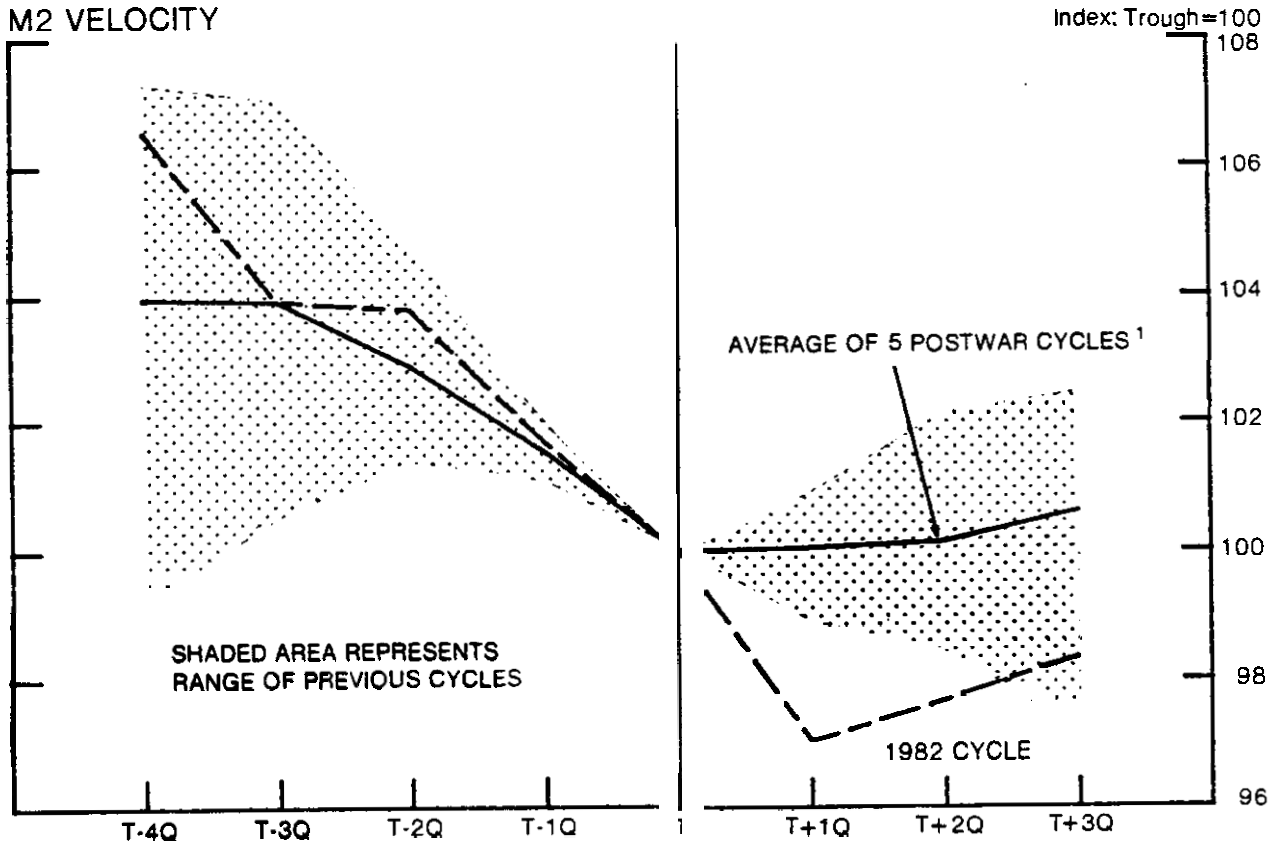


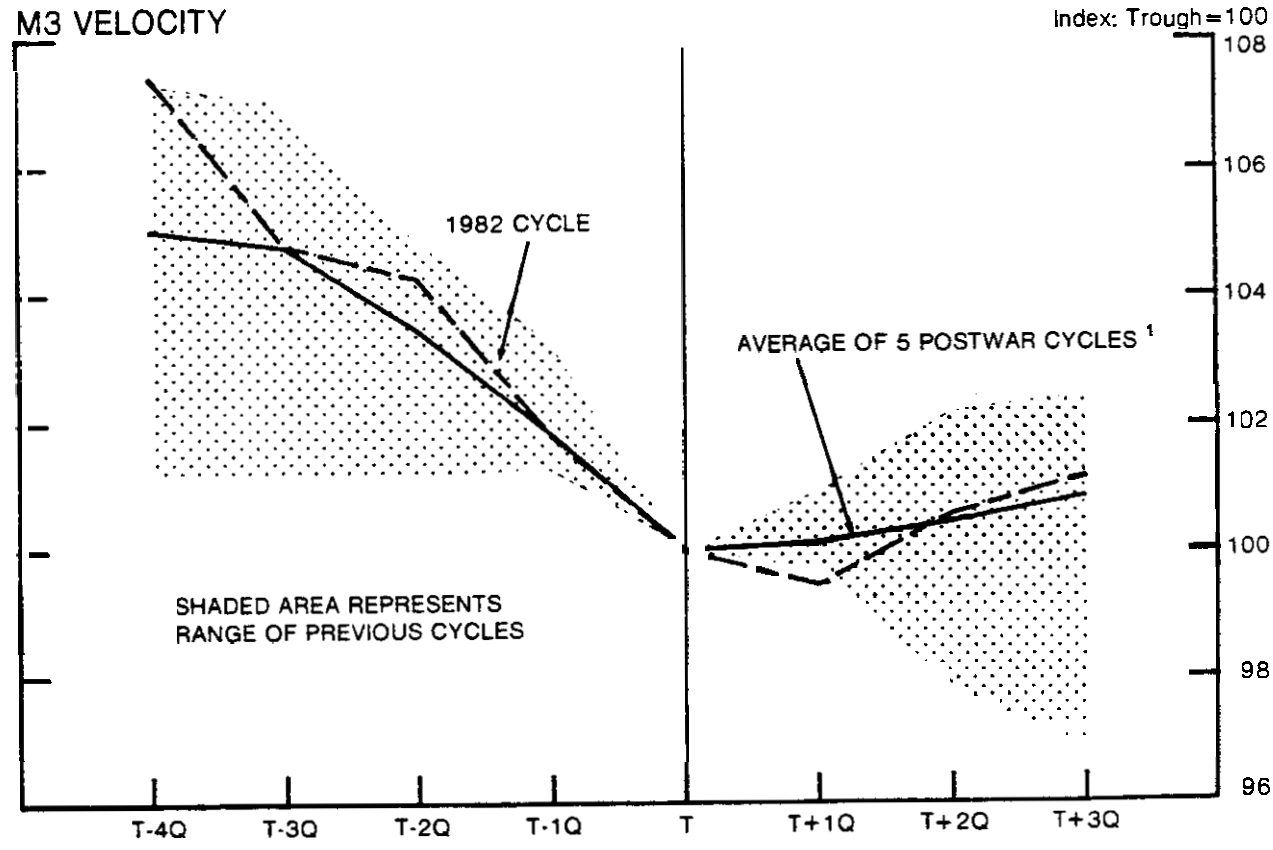


Note: Period covers 1952:Q1 to 1983:Q3

Chart 4

Cyclical Comparison of M2 and M3 Velocities





[1] Excludes 1948-49 and 1980 cycles.

Chart 5

Velocity Growth

Growth From Four Quarters Earlier

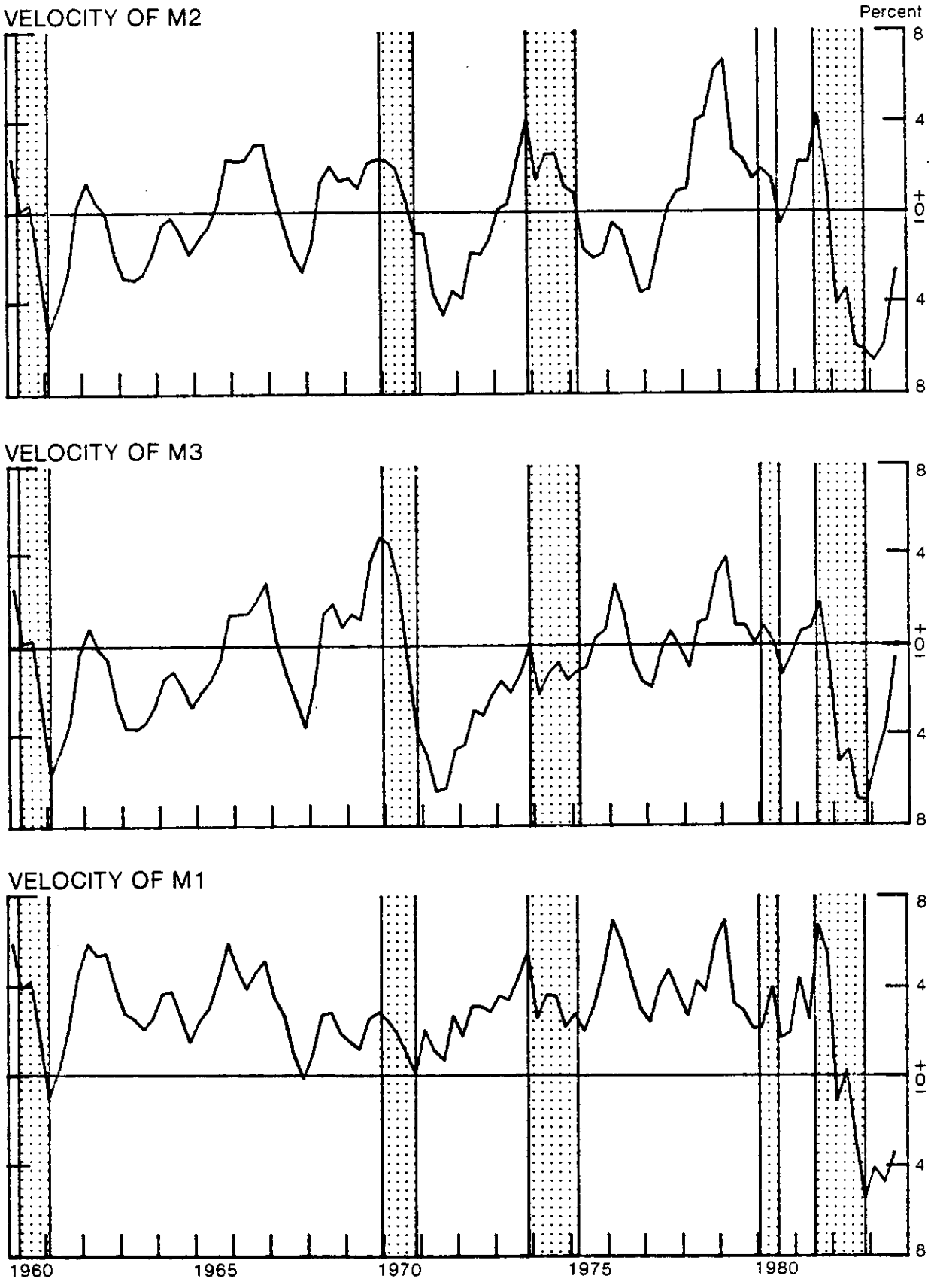


Chart 6

Debt Velocity

Quarterly

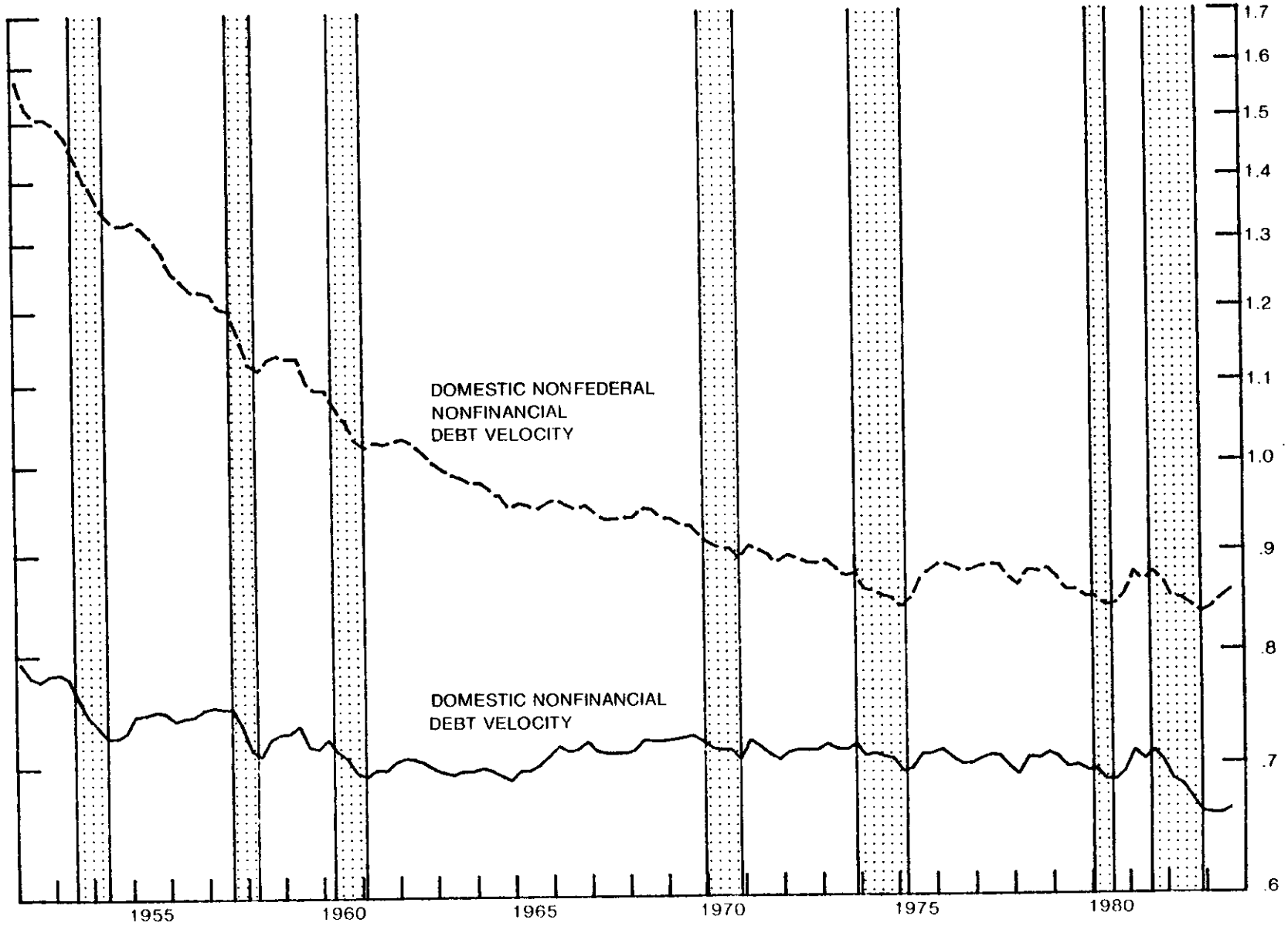
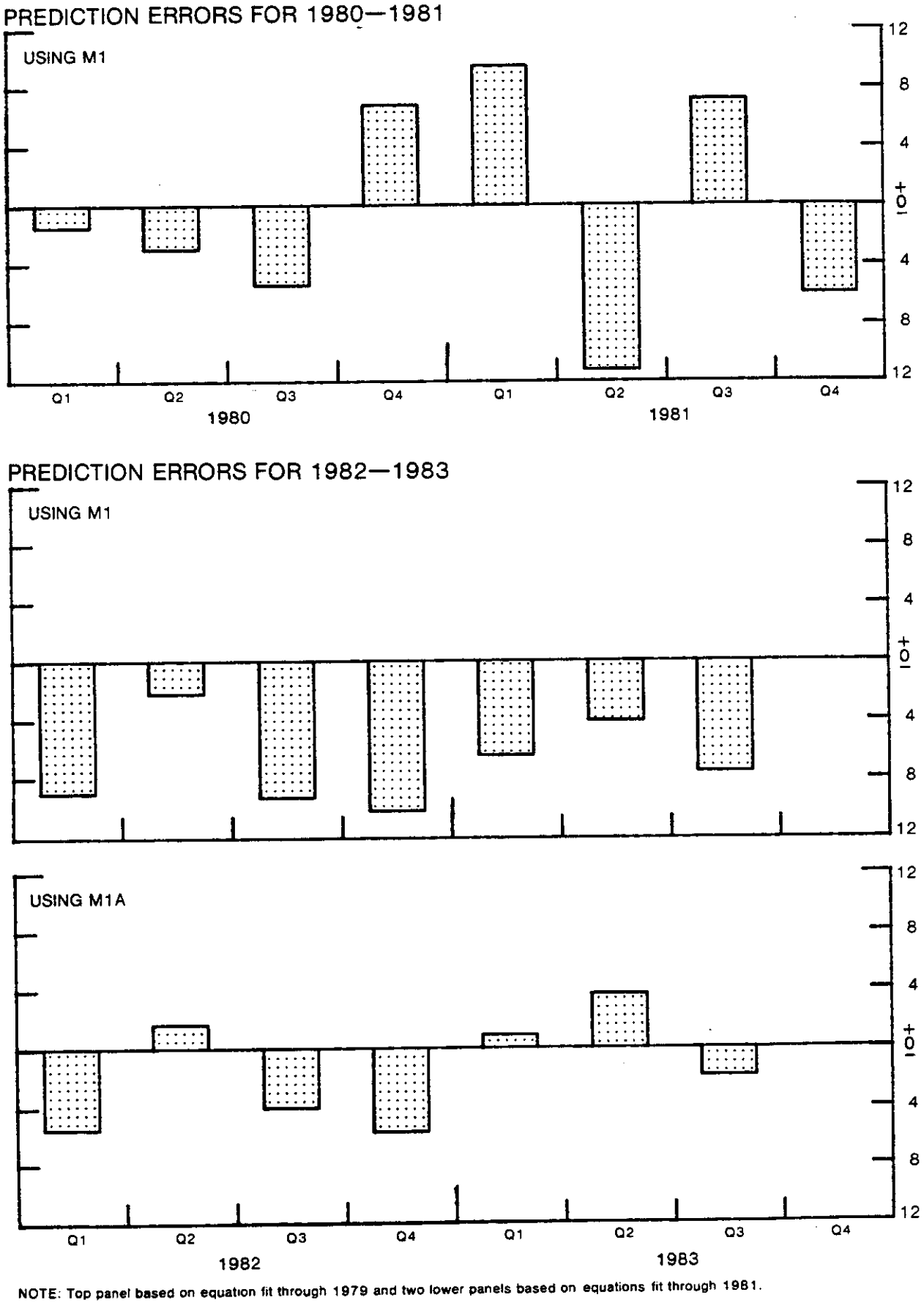


Chart 7

GNP Prediction Errors in Recent Years from St. Louis-type Reduced-form Equations

Actual Less Predicted GNP Growth, at an Annual Rate



NOTE: Top panel based on equation fit through 1979 and two lower panels based on equations fit through 1981.

Chart 8

Velocities

Quarterly